Notice No.2

for the

Code for Lifting Appliances in a Marine Environment

July 2020

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note for the corrigenda items paragraphs, Tables and Figures are not shown in their entirety.

Issue date: June 2021

Amendments to	**Effective date**	**IACS/IMO implementation (if applicable)**
Chapter 4, Section 2	1 July 2021	NA
Chapter 12, Section 3	1 July 2021	1 July 2021

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Chapter 4
Cranes and Submersible Lifting Appliances

■ *Section 2*
Shipboard cranes

2.17 Allowable stress – Elastic failure

2.17.1 The allowable stress, σ_a, is to be taken as the failure stress of the component concerned multiplied by a stress factor, ~~F~~ *F* which depends on the load case considered. The allowable stress is given by the general expression:

$$\sigma_a = F\sigma$$

where

σ_a = allowable stress

F = stress factor to be as defined in *Table 4.2.6 Stress factor*, F

σ = failure stress as defined in *Table 4.2.7 Failure stress*~~.~~

Table 4.2.6 Stress factor, *F*

Load case	Stress factor, F
1	0,67
2	0,75
3 and 4	0,85

2.17.2 The stress factors, F, for steels in which $\sigma_y/\sigma_u \leq 0{,}85$

where

σ_y = minimum specified yield stress of material

σ_u = minimum specified ultimate tensile stress of the material

= are given in *Table 4.2.6 Stress factor*, F

2.17.3 For steel with ~~$\sigma_y/\sigma_u > 0{,}85$~~ $0{,}85 < \sigma_y/\sigma_u \leq 0{,}94$, the allowable stress is to be derived from the following expression:

$$\sigma_a = 0{,}459F(\sigma_u + \sigma_y)$$

$$\tau_a = 0{,}266F(\sigma_u + \sigma_y)$$

where

τ_a = allowable shear stress

F = stress factor to be as defined in *Table 4.2.6 Stress factor*, F~~.~~

2.17.4 Steel~~s~~ with $\sigma_y/\sigma_u > 0{,}94$ ~~are not generally acceptable and are~~ will be specially considered.

2.17.5 When the actual yield to ultimate tensile ratio of the material is greater than 0,94, peak stresses beyond the nominal allowable stresses, (*see Ch 4, 2.17 Allowable stress – Elastic failure 2.17.1* to *Ch 4, 2.17 Allowable stress – Elastic failure 2.17.4*, and *Ch 4, 2.17 Allowable stress – Elastic failure 2.17.6* to *Ch 4, 2.17 Allowable stress – Elastic failure 2.17.8*) shall be limited to the higher allowable stresses as defined in *Ch 4, 2.17 Allowable stress – Elastic failure 2.17.9.* Higher peak stresses beyond such a limit will be specially considered, taking into account the actual yield to ultimate tensile strength ratio.

~~2.17.5~~ 2.17.6 The failure stresses for the elastic modes of failure are given in *Table 4.2.7 Failure stress*.

Table 4.2.7 Failure stress

Mode of failure	Symbol	Failure stress
Tension	σ_t	$1{,}0\sigma_y$
Compression	σ_c	$1{,}0\sigma_y$
Shear	τ	$0{,}58\sigma_y$
Bearing	σ_{br}	$1{,}0\sigma_y$

~~2.17.6~~ 2.17.7 For components subjected to combined stresses the following allowable stress criteria are to be used:

(a) $\sigma_{xx} \leq \sigma_a$

(b) $\sigma_{yy} \leq \sigma_a$

(c) $\tau_o \leq \tau_a$

(d) $\sigma_e = \sqrt{\sigma_{xx}^2 + \sigma_{yy}^2 - \sigma_{xx}\sigma_{yy} + 3\tau_o^2} \leq 1{,}1\sigma_a$

where

σ_{xx} = applied stress in x direction

σ_{yy} = applied stress in y direction

τ_o = applied shear stress~~.~~

σ_e = von Mises equivalent stress

Existing paragraph 2.17.7 has been renumbered 2.17.8.

~~2.17.8~~ 2.17.9 In the case where the structural analysis is carried out by means of detailed finite element models, higher allowable stresses may be applied as follows:

(a) $\sigma_{1.FE} \leq 1{,}1\sigma_a$

(b) $\sigma_{2.FE} \leq 1{,}1\sigma_a$

(c) $\tau_{o.FE} \leq 1{,}1\tau_a$

(d) $\sigma_{e.FE} \leq 1{,}1^2\sigma_a$

where

$\sigma_{1.FE}$ = first principal stress

$\sigma_{2.FE}$ = second principal stress

$\tau_{o.FE}$ = shear stress

$\sigma_{e.FE}$ = von Mises equivalent stress

Higher allowable stresses, as defined here, may only be applied if the actual stresses are localised. In the case where the actual stresses may also be calculated by means of analytical methods, these higher allowable stresses are not applicable and *Ch 4, 2.17 Allowable stress – Elastic failure 2.17.1* ~~are~~ is to be applied.

Chapter 12
Testing, Marking and Surveys

■ *Section 3*
Survey requirements

3.2 Initial Survey of new installations

3.2.4 Non-destructive examination (NDE) is to be carried out by suitably qualified operators to the satisfaction of the Surveyor. The minimum requirements for NDE are given in *Table 12.3.1 Minimum requirements for NDE*, but this may be extended at the discretion of the Surveyor. For the Steels shown in *Table 12.3.2 Cooling times prior to non-destructive examination*, the following cooling times are to be observed prior to the application of non-destructive examination to completed welding.

Table 12.3.2 Cooling times prior to non-destructive examination

Type of steel	Cooling time prior to applying NDE (after all welds have reached ambient temperature and after any applicable post weld heat treatment)
Specified Yield strength < 420 N/mm^2 and CE ≤ 0,41	On welded structure reaching ambient temperature
420 N/mm^2 ≤ Specified Yield strength ≤ 690 N/mm^2	Not before 48 hours after completion of welding
Specified Yield strength > 690 N/mm^2	Not before 72 hours after completion of welding
Note *1*. At the discretion of the Surveyor, the 72 hour interval may be reduced to 48 hours for radiographic or ultrasonic inspection, provided there is no indication of delayed cracking, and a complete visual and random magnetic particle or penetrant inspection to the satisfaction of the Surveyor is conducted 72 hours after welds have been completed and cooled to ambient temperature. **Note** *2*. Regardless of yield strength, consideration is to be given to requiring a delayed inspection where evidence of delayed cracking has been observed in production welds. **Note** *3*. At the discretion of the Surveyor, a longer interval and/or additional random inspection at a later period may be required, for example, in case of high thickness welds.	

Existing Tables 12.3.2 to 12.3.7 have been renumbered 12.3.3 to 12.3.8.

3.2.5 Where PWHT is carried out the requirement for testing after a delay period may be relaxed, at the discretion of the Surveyor.

Existing paragraphs 3.2.5 to 3.2.11 have been renumbered 3.2.6 to 3.2.12.

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